

CHANGES:
DISABILITY
AND THE CHALLENGE
OF RENOVATION

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*The Barrier Free Design Centre of
The Muscular Dystrophy Association
of Canada*

Canadian Housing Design Council
and
Policy Research, Analysis
and Liaison Directorate
Policy Coordination Bureau
Consumer and Corporate Affairs Canada

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FOREWORD

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Two years ago the Canadian Housing Design Council, in cooperation with Consumer and Corporate Affairs Canada, produced *Making Your Home Accessible: A Disabled Consumer's Guide*. This 95-page publication has been distributed throughout Canada and abroad, in both official languages, and in a quantity exceeding twenty thousand copies.

Recognizing that an accessible home environment can greatly enhance the quality of life for anyone with mobility problems, the Council sought during 1984 to identify an existing residence which might serve as an accessibility demonstration project.

Through the cooperation and financial assistance of Canada Mortgage and Housing Corporation, we entered into partnership with the Barrier Free Design Centre, and with Gina and Ray Osborne of Brampton, Ontario, and all 16 members of the remarkable Osborne family. This publication, a sequel to *Making Your Home Accessible*, is the story of how the Osbornes overcame all obstacles in renovating their home to make it functional and accessible.

Coincidental with this project, the Council is engaged as a partner with TV ONTARIO, in the production of a 28-minute videotape about the renovation of the Osborne residence in 1984. It will be one episode in the ongoing TV series "People Patterns."

Robbins Elliott
Executive Director
Canadian Housing Design Council

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INTRODUCTION

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The renovation of a home to better accommodate a disabled family member can be a complex and demanding process. Seldom are the realities of home renovation fully understood by a family before it embarks on such a project. Many are bewildered and often frightened by the very idea. Understanding the process, what to expect and when to expect it, will help to alleviate these fears and reassure a family that they can participate and benefit from the process of renovation. The outcome should be a safe and practical environment. And there is no reason why it should not also enhance the aesthetics and value of the home.

This book documents one family's experience of renovating their home. The Osbornes are a unique family with 16 children, 15 of whom are adopted. Many of the children are disabled and require a supportive environment in order to function well. The family has a large cross section of age groups and disability types, some of which will represent situations found in many homes. The Osborne renovation is extensive and deals with most of the important elements which influence accessibility in a home environment. Furthermore, the experience the family gained during two previous additions to their house, and the parents' realistic assessment of their children's abilities, make this project a relevant example to all.

Readers should note, however, that every renovation is different. The process that evolves, and the design solutions that are developed, will, as in the Osbornes' case, reflect each family's unique situation. Within this context, the Osborne experience is thus presented as an introduction to the challenge of renovation!



CHAPTER 1

Profiles

"Our range of disabilities runs from blindness through to a child who is in a wheelchair constantly, nonverbal and not able to do things for herself. In that spectrum, we have children who are incontinent, limbless, deaf. We had to build in the features that are going to implement all that, and I think we've come across with a reasonably good cross section of things that every child can use.

In breaking away from the established way of dealing with disabled people, we had to find alternatives...which has been a challenge to us. We now have knowledge that we didn't have before. Just keeping it to ourselves doesn't seem fair.*"

*Display quotations throughout the text are taken from an interview with Gina and Ray Osborne.

THE FAMILY

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RAY OSBORNE — Father

Ray is a full-time father who also works full time as a maintenance mechanic for a local electrical company. He is a very active handyman working on various projects about the house. Much of the furniture in the Osborne home and many of the custom-built kitchen facilities have been constructed by Ray. In addition, he is an active member in a number of local parent action groups.

GINA OSBORNE — Mother

Gina is a full-time mother and homemaker who also works part time as a translator for the Peel Board of Education and for the Task Force Committee of the Ontario Ministry of Health. Most of her time is devoted to the family, but somehow, like her husband, she manages to be an active member of many parent groups and community organizations.

JAMIE — Age 19

Jamie is a full-time student who attends the local secondary school. She is interested in art and does well, despite a learning disability. She is the eldest of the family, with plans to become a social worker in her native Indian community. Jamie joined the family at age 15 together with her four natural brothers and sisters (Tom, Michael, Phyllis and Liza).

TOM — Age 17

Tom is a full-time student attending the local secondary school. Like his sister Jamie, he is a talented artist and is contemplating studying architecture at university. He has a love of animals and sometimes helps out on a local farm. Tom joined the family at age 13.

PHYLLIS — Age 16

Phyllis is also a full-time student attending the local secondary school. She enjoys children and horses and hopes to develop a career related to either area. She loves being a big sister to all the younger family members. Phyllis has a learning disability and joined the family at age 12.

DAVID — Age 15

David is a full-time student integrated into the local school system. He is visually impaired and partially deaf. When he was young, David had a disease of the joints which disabled his hands and feet. David is a bright and loving child who loves to write, draw and play the organ. He is very independent and is considering a career as either a computer programmer or priest. David joined the family at age 6.

LIZA — Age 14

Liza is a full-time student attending a local school. She enjoys working with animals and children and, according to her mother, is developing an interest in boys and phone calls. Liza has a learning disability and is visually impaired, but through the use of braille she has learned to read and write well. She joined the family at age 11.

JOHN — Age 14

John is the natural "birth child" of Gina and Ray Osborne. He is quiet and bright, with interests in computers, girls and Greek mythology. John is presently attending school full time and is considering a career as an archaeologist.

DOREEN — Age 13

Doreen is a full-time student totally integrated into the local school system. She is blind and was born with spina bifida, which has left her paralyzed from the waist down. Doreen is very independent and helps with the household chores. She has learned to read and write using braille, and is considering becoming a braille teacher when she is older. Doreen joined the family at age 5.

LINDA — Age 13

Linda is also a full-time student attending a local school. She has a severe learning disability but enjoys working with young children and helping to look after her younger sister Michele. Linda hopes to work as a cosmetologist. She joined the family at age 7.

MICHAEL — Age 12

Michael is a full-time student attending a local school. His disabilities stem from fetal alcohol syndrome, which affected his heart and liver and brought about a learning disability. Michael is affectionately described by his parents as hyperactive — a real "handful," but a likeable child who requires lots of supervision. Michael joined the family at age 8.

KRISTAN — Age 12

Kristan also attends the local school as a full-time student. She has sore bones and joints as a result of rickets. Nonetheless, Kristan enjoys dance, gymnastics and piano and is described as beautiful, sociable and likeable. She is considering a career in the performing arts or as a speech pathologist. Kristan joined the family when she was one year old.

TICEY — Age 11

Ticey attends a local school full time. She keeps her parents on their toes with her sometimes disruptive behaviour and her enormous amount of energy. Ticey is a survivor of the Vietnam war and is described by her parents as being nonconformist but gorgeous. She enjoys playing big sister to her younger siblings and wants to be a lawyer when she is older. Ticey joined the family when she was about two years old. Her exact age is unknown.

MICHELE — Age 11

Michele is integrated into the local school system. She has cerebral palsy, which has severely limited her mobility and speech. Michele uses a manual wheelchair to which a large bliss board is attached. She communicates with others by means of the bliss board by pointing to the bliss symbols. Michele is totally dependent on others for her daily living activities, including getting around in her wheelchair. She is determined, yet can be disruptive. Michele joined the family about one year ago after being institutionalized for many years and is unfortunately having some difficulty adjusting to certain aspects of family life. She is a likeable child who enjoys participating in family activities.

JOSHUA (J.J.) — Age 10

Joshua also attends a local school full time. He was born without legs and with only stumps for arms, but he has mastered his disability through the use of artificial legs (prostheses) and myoelectric arms. Joshua uses arm crutches to walk and can now do almost anything that other children of his age can do. He enjoys soccer and swimming and is described as being aggressive and totally independent. He constantly pushes himself to the limits of his abilities. Joshua enjoys acting as a big brother to the younger family members, particularly to Talli, who is similarly disabled. He is teaching her the techniques he has developed to move around. Joshua has aspirations to be a pilot. He joined the family at age 3.

DANIEL — Age 4

Daniel is the most recent addition to the family. He was adopted at age 4 from an institution in Hong Kong. He has no limbs and is dependent on others for almost everything. Daniel can, however, feed himself and is learning to get around by rolling across the floor. He appears very intelligent and has mastered speaking English very quickly.

PATRICK — Age 4

Patrick is brain damaged and has severely impaired vision and hearing. His behaviour is autistic and he is described as being hyperactive and an "escape artist." Patrick likes to explore! He can feed and dress himself but requires constant supervision. Patrick attends a local nursery school part time. He joined the family when he was 18 months old.

TALLI — Age 4

Talli has no arms and both her legs have the thighs and knees missing (her lower legs are fixed to her hips). She can draw, paint, do puzzles and many other things by using only her feet. Talli can walk independently and she has mastered the use of myoelectric arms. She is described as being bright, assertive and very precocious. She has decided to be a doctor when she is older. Talli joined the family at age 2.

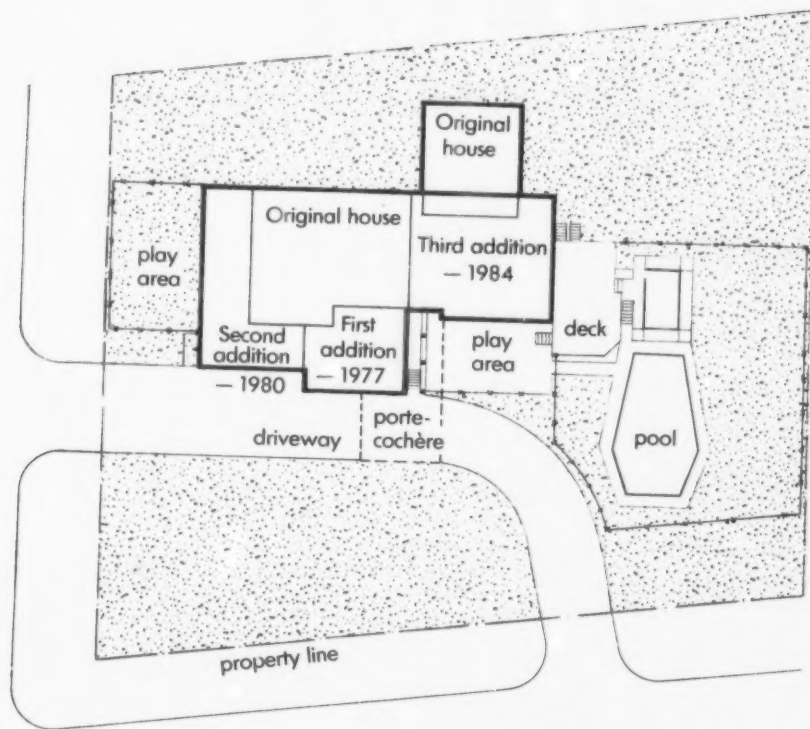
THE HOUSE



SOUTH ELEVATION

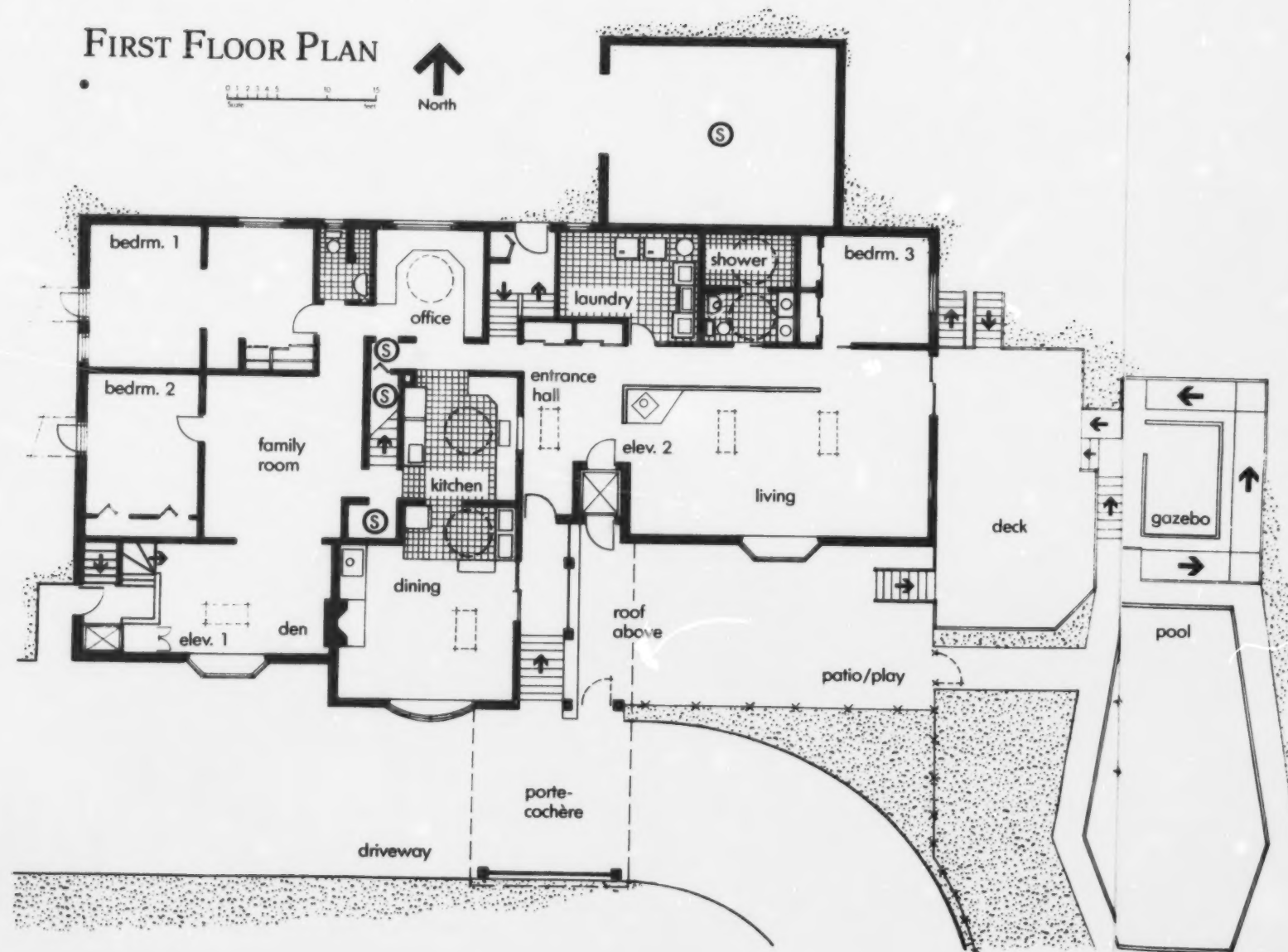
0 1 2 3 4 5 10 15
Scale feet

SITE PLAN



FIRST FLOOR PLAN

0 1 2 3 4 5 10 15
feet



BASEMENT FLOOR PLAN

0 1 2 3 4 5 10 15
feet



LEGEND



Fence



Skylight above



Stair up



Escape window



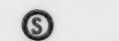
Pocket door



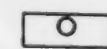
Sliding door



Bi-fold door



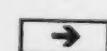
Storage



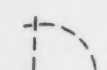
Woodstove



Wheelchair turning circle



Ramp up



Gate



Stovetop



Urinal



Pedestal basin



CHAPTER 2

The process of renovation

“It is an unnerving situation, disrupting and everything else, and I think it’s all draining to the whole family. But it has to be done and you have to be involved. The initial outlay, the cost, the mortgage, is something that you’re going to have to live with for the rest of your lives. You might as well have it done right, and you’d better be prepared to put out that extra effort. With a child like Michele, who is totally dependent on a wheelchair, you had to physically move barriers [out of her way] so she could have freedom of access....we dreamed of having a house that was totally accessible....I think with Michele there was no way we could manage her unless we had [an accessible home]....I mean, it was like she was the clincher that gave us the momentum to do it.”

FIRST STEPS

"The house wasn't adequate when we started bulging at the seams and more children became wheelchair bound. That's when we decided we had to add on something that would make the house more accessible.... We tried to consider every member of the family."

The process of renovation begins with the realization that the existing space in a home is no longer adequate to meet the needs of its occupants. For the Osborne family this realization occurred almost overnight with the adoption of Jamie, Tom, Phyllis, Liza and Michael. This increased the family size to 12 children, a number of whom were physically disabled.

Equally important as family size in the decision to renovate were the evolving needs of the children, particularly the disabled children. Gina and Ray had become unable and unwilling to carry the disabled children about the house; unable because of the size and weight of the children and unwilling because of a strong belief that their children should be as independent as possible. This meant an increased dependency upon mobility aids such as wheelchairs and crutches, however, devices which the house could not easily accommodate. The Osbornes had considered the option of moving to another home but concluded that they did not want their family uprooted to unfamiliar surroundings, particularly those children who had recently joined the family and for the first time were enjoying a stable and supportive environment. Although a renovation would be disruptive, it would not be as detrimental as a move. Consequently, Gina and Ray decided to explore the feasibility of building a major addition.

The family worked together in identifying a number of basic problem areas within the existing house. The bathrooms were too small, in the wrong location and not fully accessible to the children with disabilities. More bedrooms incorporating better ventilation and better use of light and space were required. Improved and expanded laundry facilities were needed. Better and more storage was necessary. Better communication between different activity areas was required. And the elevator needed to be replaced with a more usable and up-to-date elevating device. In addition, they identified the need for a larger leisure activity area to accommodate all family members, and the necessity for alternative emergency exits. The family also knew that any addition or alteration to their home should not be institutional, in any way! At this early stage in the process, Gina often referred to the "dream home," which she envisioned as a comfortable place to raise her family. It was, as is the beginning of any renovation, the time

for dreams. And although the final result was altered by structural and financial limitations, it was their dream that encouraged the Osbornes to forge ahead.

Armed with their basic requirements and a vague idea of what they wanted the addition to look like, the Osbornes set about finding an architect who could help them develop their ideas. A local nonprofit housing agency was approached and asked to suggest names of architects who had experience in designing similar projects. A number of architects were suggested and interviewed personally, or were contacted by telephone by Gina or Ray. In each instance, the architect's background and design philosophy were discussed along with the family's thoughts and ideas for their own project. Through this process, one architect was selected who had an extensive background in designing for physically disabled persons and, perhaps more importantly, with whom Gina and Ray felt comfortable.

The architect met with the entire family on a number of occasions to discuss the current and future needs of each individual child and of the family as a whole. Using their past experience, Gina and Ray listed the features necessary to accommodate each member of the family. Also, the children listed the facilities they wished to see in the new home. These aspects were then discussed at group meetings, which were often attended by the architect.

All family members were very involved in the meetings, with each person having to explain, and justify, the individual needs and requirements that he or she had listed. Many feelings surfaced, both positive and negative. For example, two of the children had very strong feelings that an addition was not necessary and should not be built. Further discussions suggested that these children feared the upheaval of the renovation because of the many traumatic changes that had shaped their lives before joining the Osborne family. They believed the proposed addition would mean a similar disruptive experience. Gina and Ray, recognizing the importance of this fear, reached a compromise by keeping the bedrooms for these children within the existing house.

The sense of belonging to the family and the home was also expressed by the children who had experienced the construction of the two previous additions. These children encouraged the others. They spoke of the strong bond that had developed during the design and construction process, the reality of being part of a family and having roots, the appreciation of having a home! The family worked together, expressing the needs and ideas of everyone and developing a clear understanding of what they wanted. As a result of these discussions, a personal profile of each family member incorporating specific design criteria, was developed by the architect. These criteria, along with the basic design requirements, were incorporated in a written report which was reviewed by the Osborne family. The architect then developed a concept design proposal. Throughout the design development, the family was consulted and kept informed and their comments were used to refine the proposal. The architect developed schematic drawings and conceptual three-dimensional models along the way to the final concept design proposal.

The resulting design was a spacious two-storey addition. However, it reflected only the ideal situation, incorporating the best of everything but ignoring the realities of cost. Gina's "dream home" had in fact materialized but at a cost of about \$200,000, which was beyond the means and expectations of the Osbornes.

The family and their architect then began the process of redefining their needs to establish essential and nonessential requirements. Com-

promises were made and new design criteria established. The concept design proposal was studied by the architect and trimmed to a minimum, but Gina and Ray still felt that the cost was beyond their means. It had become apparent that funding the project would be more difficult than expected. The Osbornes decided to halt the process and evaluate their options. However, the work of the original architect was not to be discarded. As Gina explained, "He had not developed a usable architectural design, but rather a feasibility study of what was needed." This information was important for future use as Ray observed: "We utilized the feasibility study to find out what we really needed. The basic concept was there. We added to it and withdrew what we didn't need. In that way it was beneficial."

The Osbornes returned to the original list of architects provided by the nonprofit housing group, and began anew — now even more aware and prepared. They decided to begin with the issue that had dampened their initial effort — cost.

A second architect was soon commissioned to explore and determine the cost of alternate solutions. Three new alternatives resulted: sell the existing house and build a custom-designed home; sell the existing house and move into a new builder-designed home, working with the builder to customize it to their own requirements; or sell the existing house and buy an existing older home suitable for their needs, or which could be easily altered to suit. All three alternatives were feasible on a practical level, but the costs involved were still beyond the family's means. The family held firm to their desire to remain in their present location.

The Osbornes reexamined their needs. After careful and difficult considerations, they decided to trim the original proposal to the barest acceptable minimum. This decision, although difficult, revitalized the family as they worked hard to determine the most economical way to realize their dream. The final plan called for the building of a 30' x 40' addition with a raised first level, allowing for a full finished basement and giving a total living area of 2400 sq. ft. This configuration was studied carefully and approved by the family. The Osbornes were ready to proceed!

PRECONSTRUCTION ACTIVITIES

"The frustration in dealing with the building code or building department ...is because everyone was put off by the size [of the family]....The inspectors themselves didn't seem to know what to make of things....you know, we were stuck out there fighting it all the time and insisting that we wanted it that way. We screamed a lot."

The family had now established a basic schematic design solution. The next step was to begin to translate this "design scheme" into a new home. For economic reasons, Gina and Ray chose to take an even more active role in the project. They decided to supervise all of the construction themselves and utilize consultants only if and when necessary. They wanted to maintain as much control as possible over the construction of their new home. Gina and Ray felt confident that their experience with the two previous additions to their home equipped them to handle the project. Consequently, many of the important supervisory functions and most of the coordination usually undertaken by the project architect or contractor had to be done by the Osbornes themselves. They had to learn, and fast!

It was a very exciting, exasperating, but most of all, demanding experience that left more than a few battle scars. Nevertheless, they persevered and achieved a fully accessible home with which they are very proud and pleased.

The Osbornes asked their architect to produce a set of drawings and specifications (known as tender drawings) from which the cost of constructing the addition could be estimated by a building contractor. These drawings were prepared for estimating purposes only and not for construction; the drawings for construction were to be prepared by the successful contractor.*

The names of a number of local building contractors were sought from the local nonprofit housing agency and from other community resources. A total of six companies were given drawings and specifications and were then invited to bid on the project.

Being cautious about costs, the Osbornes asked the contractors to break down their prices in order that the family could pick and choose the "nonessential" items according to budget. The contractors submitted bids on a base price for the basic 30' x 40' house construction with finished rooms, plus separate prices for the assorted nonessential elements

*This is quite unusual since general trade practice is to have one set of drawings used for both tendering and construction.

listed by the family (elevator, porte-cochère, deck, etc.). When the bids came in, the prices were extremely varied. For the basic house, the bids ranged from \$72,000 to \$200,000, with one low bid, two high bids and three in the middle. The \$72,000 bid was more than \$26,000 lower than the next three. This aroused understandable concern. The Osbornes decided to examine the situation more closely. Even in much larger projects, the lowest bid is not necessarily the best. Prospective clients are often wary of such a variance between quotes. The Osbornes were attracted to the lowest bid but decided to research it thoroughly before proceeding. The next two bidders and the nonprofit housing agency were asked to review the lowest bid, but none of the companies could find any significant fault with it. At this time, the Osbornes were also actively looking for funding, primarily from the Government of Ontario. By accepting the lowest bid, they felt more confident of their chances of receiving financial support. They verified the contractor's references. No problems were uncovered and as a result the contract was awarded to the company which had submitted the lowest bid.

Confirmation of the legal obligations of the contractor and the Osbornes involved two processes. The first was to create a legal understanding of what was to be done along with a legal obligation to complete the work within a given time frame. The second was to obtain legal approvals from the Municipal Building Department in order to proceed with construction. For this purpose a complete set of "working drawings" was required, showing exactly how things were to be built. Working drawings were also necessary to direct the various tradespeople working for the contractor.

The first process was facilitated through the use of a written contract known in the construction industry as the Canadian Construction Document Committee standard contract #12 (CCDC #12). This standard contract established a *fixed* price for the entire project and outlined the contractor's duties and responsibilities. For the mutual benefit of the contractor and client, a payment schedule was also included. This broke down the construction process into a number of elements such as excavation, footings and foundations, and walls and roof, with percentage costs appropriately allocated. Often coupled with this is a construction schedule noting dates of completion for each area and corresponding payments. Although the Osbornes did not include this latter type of breakdown, they did specify a start and finish date for the project. And just to be sure, the Osbornes had their lawyer review the entire document.

The purpose of the second process was to ensure that the addition would comply with various construction and municipal standards. This meant applying for a building permit. The process of obtaining a building permit can be very simple or very complex. After all the planning had been completed and the drawings readied, the Osbornes wanted to start their project right away. The contractor suggested that the Osbornes themselves should submit the application to establish direct contact with the building officials and speed the process along. They did, but it took another three months before they actually received their permit to build. A permit ensures compliance with minimum building standards and as such it protects the homeowner. It also ensures compliance with various city ordinances, and this can create some conflict. Gina and Ray's desire to dispel any "institutional" classification was an issue once again. The existing municipal by-laws considered 18 people living under one roof to constitute a group home. This classification involved more stringent requirements under the Ontario Building Code. But to the Osbornes, this

represented more than just additional requirements. The Osbornes were angry that their *family* of 18 could not be understood as such by existing legislation. Fighting the status quo and the surrounding bureaucracy was not unknown territory for the Osbornes, and in their usual determined way, they communicated their concerns until eventually their home was treated as a single-family residence.

Unfortunately, the end was not yet in sight. As is customary, the building permit application made its way around various municipal departments, and was reviewed by all major departments. Aside from some minor problems, the major difficulty for the Osbornes was that due to health regulations they required a different, much larger septic tank than the one initially proposed. The Osbornes had no choice but to agree to this extra and major expenditure (see chap. V).

At the same time, the Barrier Free Design Centre was invited by the Canadian Housing Design Council to become involved in the project. The Centre is a nonprofit service operated by the Muscular Dystrophy Association of Canada and provides information, education and consultation services to persons seeking to make the environment more accessible to all. Design consultants from the Centre were called in for a final check of the layout and to fine tune details to ensure that the most current accessibility strategies and features were incorporated in the home. The consultants made a few minor comments, and supplemented the working drawings with additional drawings and information packages for the contractor to consult during construction. The consultants also cautioned Gina and Ray of the tremendous work involved in the supervision of their own construction. But, determined and armed with enthusiasm they were ready for the challenge. At long last, construction could begin!

THE CONSTRUCTION EXPERIENCE

"If you can't read the blueprints, why are you here? Why should I...find out they are putting a wall up wrong, or that the height for doors is wrong... or make sure that the elevator base is poured right?"

Although one of the Osbornes' main priorities was minimal disruption to their daily lives, they quickly discovered the drawbacks of living in their own home during construction. In addition to the noise and dust, Gina recalled that the house was without stairs for two weeks and that the garden area had "mountains of dirt" which prevented the children in wheelchairs from going outside. In retrospect, the Osbornes wished they had discussed this with the contractor prior to the actual construction, or perhaps even included these considerations as a condition in the contract. As planned, Gina and Ray were totally involved in the construction sequence of the project. They had made the decision to undertake the direct supervision of the work of the contractor and his subcontractors. The Osbornes found this experience to be very demanding on their time and energy. It was mandatory that they be on the construction site almost continuously to respond to questions and to make decisions. They also had to examine the quality of work, the accuracy and the time spent. "If we were away for an hour," notes Gina, "we'd come back and there was always something that needed to be decided or a decision had been made that was wrong."

And to complicate the scene further, as supervisors the Osbornes were expected to liaise with various building inspectors. Whenever building permits are issued, the local municipality sends an inspector to the job site to ensure compliance with various codes. In the Osbornes' case, a building inspector from the local municipality was involved, but only to monitor the construction of the addition in accordance with the provincial building code and approved permit drawings. Aspects such as the quality of finishes, hardware or the selection of fixtures were generally not of concern to the inspector. Occasionally disputes on site developed between the inspector and the Osbornes based on the interpretation of certain code-related aspects, especially those related to accessibility features such as the ramp and the elevator. As Gina remembers, "When someone is reading you the building code [regulation] number, it can be very intimidating." Gina and Ray also note, however, that some of the interpretation problems developed because inspectors were not familiar with accessibility features in a residential situation. Problems can also develop



if an inspector is unwilling or unable to comment on aspects of construction not clearly defined in the code. And to add to the confusion, there was more than one inspector on the project. The Canada Mortgage and Housing Corporation (CMHC) had provided a Residential Rehabilitation Assistance Program (RRAP) loan to the Osborne family. As is their practice, the CMHC office followed up their funding with a number of visits by their inspector to ensure that the addition was being built to the acceptable construction standards set by CMHC.*

As drawings are transformed into real buildings it is inevitable that changes occur. For example, building inspectors often suggest or enforce changes to ensure safety. Since the Osbornes were so involved in their project becoming a reality, they could monitor these changes and fine tune their initial design decisions. This involved a number of design changes, changes of materials, and substitutions of materials for unavailable items. All of these departures from the construction sequence usually involved a change in price. The contractor then had to estimate the cost of these changes and submit the cost in writing with receipts, or contracts for subcontractor work. Under the contract, this procedure was mandatory before a change could be approved. As each segment of the project was fully completed, payment for that portion would then be made. The payments were never released in full, since a percentage of each payment was held back by the Osbornes, as required by the Construction Lien Act in the Province of Ontario. This percentage was released to the contractor only after the lien period had expired. This measure is a protection in the event the contractor does not pay for the goods or labour used for the project. If this were the case, the original supplier of the goods or labour could then place a "lien" or claim against the client's house to retrieve payment for goods or labour used. If funds were withheld, they could be used to pay off the lien. In Ontario, if the lien is not placed on the house within 45 days of the substantial completion date of the job, it is invalid. This is why funds held back are usually released after 45 days. The Osbornes later discovered that they did have a lien placed on their house. They involved their lawyer, removed the lien and were not out of pocket for funds.

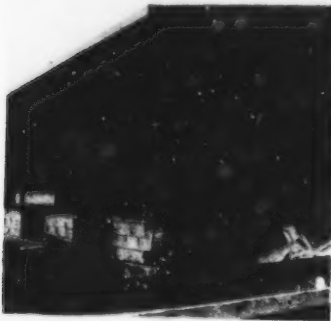
Another aspect of the construction process with which the Osbornes were concerned was the lack of coordination on site by the general contractor. The contract did not state that a representative from the general contractor had to be on site at all times. As a result, subcontracted tradespeople often arrived on site with very little knowledge of why they were there or exactly what they had to do. It was not the Osbornes' responsibility to direct them, but had they not, many mistakes would have been made.

*These standards can be found in Canada Mortgage and Housing Corporation. *Housing Disabled Persons* (Ottawa. 1982).

Basement under construction.

First floor structure under construction.

Roof under construction.



AFTER CONSTRUCTION

"We take pride in it [the addition] because we had to fight so much for it....we would like to have a way to share [our experiences] with other people, because we hope...families keep the disabled at home and not send them away anymore."

Unfortunately, even after the addition was built many small items were still outstanding. The contractor had moved on to another job and it was difficult to motivate him to return and fix these deficiencies. Problems had also developed with the fabrication of the elevator cab, which was already two months behind schedule. The project thus dragged on.

In order to defray costs, Gina and Ray had not included any painting or staining as part of the work of the contractor. Instead they had intended to complete this work themselves. Ray comments that "the first time [i.e., the first extension] I did a lot of the work myself....this time I did some of the work myself....If I was doing it again I would have a complete price on the finished product. That includes painting, trim, everything!" After enduring three long months of disruption, the Osbornes were very anxious for it to be finished and to move into their new living quarters.

At long last the addition was completed. The family moved into the extension and began to enjoy the results of all their dedication and hard work. Their home was finally fully accessible, providing a safe and supportive environment to all members of the family. When asked to identify what they were most pleased with in their new home, both Gina and Ray had the same reply: "How it looks!" They had achieved their major goal, ensuring that their home did not in any way resemble an institution or impart institutional feelings, just because it had to accommodate disabled children.

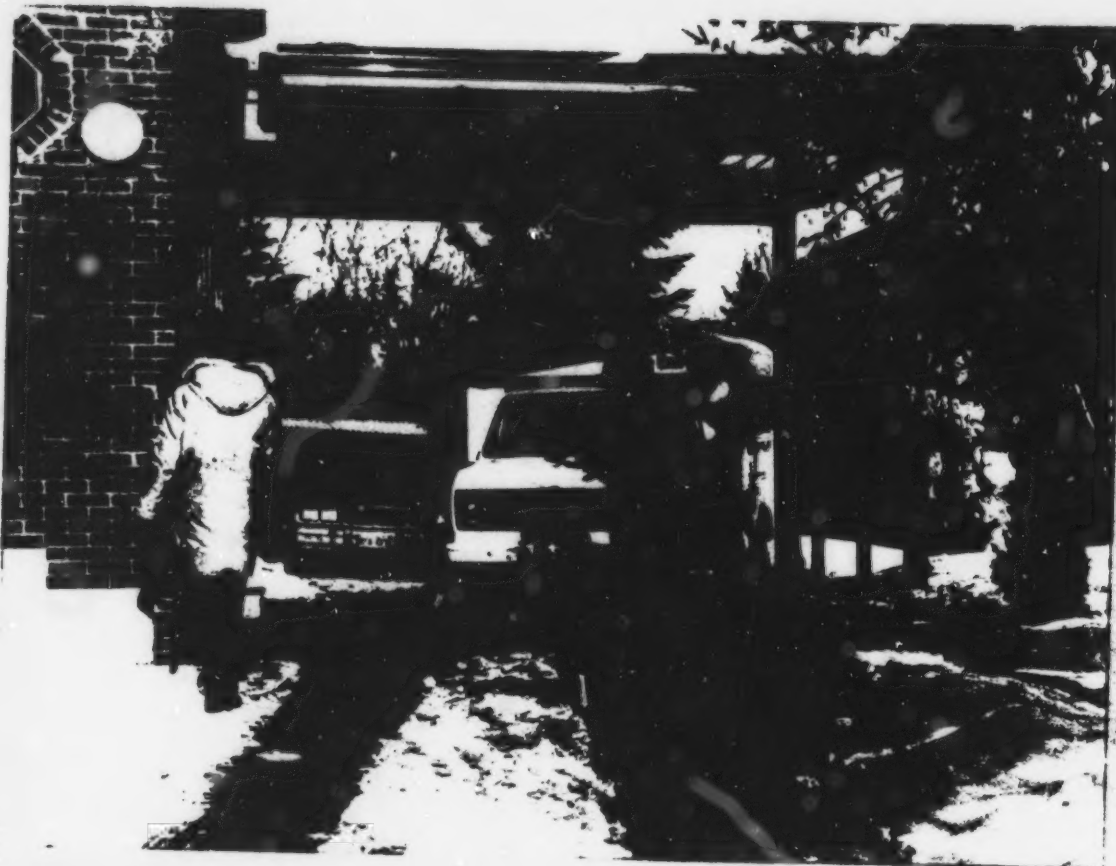
Are the Osbornes pleased with the results? Ray notes, "I think the result is what I wanted...but if I had to do it over again, I would have an intermediary between us and the contractor — an architect or someone like that to deal with the day-to-day problems." The Osborne addition represents more than a simple addition; it represents a commitment. As Gina expresses, "I think we are very happy with what we've got, but I think we take pride in it because we had to fight so much for it....you know people say that I didn't know it was going to be so nice! I think we always knew that it was going to be nice because we put a lot of effort into it...and we're glad."



The completed addition and deck structure.

TIME SCHEDULE

First addition to house	1977	
Second addition to house	1980	
First contemplated need for a third addition	March 1982	First steps
Contacted architect	October 1982	
First design proposal	March 1983	
Revised design proposal	May 1983	
Contacted second architect	September 1983	
Second design proposal	February 1984	
Project tendering	February 1984	Preconstruction activities
Contractor selected	March 1984	
Building permit application	April 1984	
Building permit award	June 1984	
Contract signed	June 1984	
Construction start — proposed	June 1, 1984	The construction experience
— actual	July 4, 1984	
Construction substantial completion — proposed	August 30, 1984	
— actual	November 1, 1984	
99% completion	November 18, 1984	
100% completion	1985 (?)	After construction



CHAPTER 3

The important parts

"The best thing...is to show the way we handled it [the addition]. A person who has heard about grab bars and elevators and who has the idea that it's supposed to look like an institution will say, What do you mean? I don't see anything for the disabled here...and to us that's a compliment. I don't think there's any person who is disabled who can't come into the house and utilize most of the facilities. And it doesn't have to look like an institution."

OUTSIDE THE HOUSE

"When you're boarding the children into a special bus, they go on a lift which takes quite a while to come down and then go up again. You can only put one wheelchair on at a time....the process for just three children might take 15 minutes...and if it's pouring with rain or snowing? ...We wanted a covered area for loading and unloading."

The Osborne residence is located in a rural area, just west of the town of Brampton, Ontario. As in most rural settings there is not the frequency of public services available in most urban areas. There is no public transportation system and consequently the principal link to employment and leisure facilities is by private vehicle. For these activities the family relies on their car and their van which is equipped with a wheelchair lift. The children travel to and from the local schools by school bus.

Because of their reliance on their private vehicles, the Osbornes wanted to ensure that the loading of passengers and goods could be undertaken safely and free from the elements. They therefore had a porte-cochère (a covered drive-through area) built adjacent to the main entrance. It is high enough to accommodate a school bus, giving the Osbornes protection against sun, rain and snow while they are loading or unloading. The convenience is immeasurable considering the time required to assist a number of disabled children into one vehicle. In addition, this area doubles as a play space for the children. The driveway is part of a planned route of connecting pathways linking other areas of the property. These routes are all paved and 'wheelable.' A number of hard landscaped patio/play areas have also been provided (see Play Spaces).

A new deck structure has been built to the east of the addition at the same level as the living room. It provides recreation space and an access from the house to the pool and patio areas. This access is made easier through the new 6' wide sliding patio doors, which give about 30" clear width when the doors are open — enough to allow a child in a wheelchair through. There is no change in level between the inside floor surface and the outside deck so that a disabled child can easily make the transition from inside to outside. The surface of the deck area is made of 2" x 6" pressure-treated wood planking with a ¼" drainage space between each plank. This last dimension is very important, since anything wider than ¼" would be difficult to negotiate in a wheelchair. Another accessibility feature incorporated into the deck design is a safety railing around the perimeter of the deck. Coupled with this is a curb along the edges of the deck to prevent the wheels of a wheelchair from rolling over the edge.



The new deck structure leads from the house to the pool and patio areas.

The upper level of the deck is used as a recreation and play area by all of the family. A short ramp leads to a lower level incorporating an enclosed and covered area to give protection from insects. This covered area is important because a number of the family members have severe allergic reactions to insect bites.

A further ramp from this level wraps around the deck structure, giving access to the patio and pool areas at grade (see *The House*, chap. 1). The Ontario Building Code stipulates certain minimum requirements regarding ramp design. However, these apply only to public buildings and not to single-family homes. The Osbornes selected a slope for their ramp which is much steeper than the 1:12 ratio (one foot rise for every twelve feet length of run) recommended by most building code standards. The Osbornes understood this point but rationalized that the main purpose of the ramp was as a secondary exit route from the house in an emergency situation (see chap. 4). They felt that in an emergency, someone would always be assisting each child in a wheelchair. In these circumstances, the steeper slope was acceptable. A more desirable slope would have been the 1:12 slope, with larger landings at the turns. If the ramp were the sole means of entry for the wheelchair users, careful planning would have been necessary, for slopes of 1:20 are not uncommon to ensure independent use of a ramp. In the Osborne home, the main accessible route from the house to the pool and patio area is by the elevator and paved access pathway, and not the ramp.

Unloading from the school bus.



ENTRANCES

"When it comes down to door handles...some of it was professionally advised and some of it was just common sense. The handles on doors...are of a lever type which makes it easier for somebody like J.J. [Joshua] who hasn't got the mobility of a hand to open it...these things don't add to the cost if they are implemented at the time of the building. They're easy, sensible things."



Other exterior renovations were also undertaken. The steep exterior stairs approaching the front entrance door were demolished and rebuilt to a shallower angle. The result is a more comfortable and safer stairway. Nosings, or protrusions in the stair profile, were eliminated to reduce the chance of tripping. A tubular handrail was provided at one side of the stair. As an added bonus to both safety and maintenance, the main entrance door was covered for weather protection. There are five other entrances to the house, two of which are designed for wheelchair accessibility. Access routes to and from these two doors are paved and ramped and are usable as secondary exits in an emergency situation (see chap. 4).

The standard knob-type door hardware was found to be difficult to manipulate by some of the children with limited wrist, hand or finger dexterity. Because of this, most of the exterior doors have been equipped with lever-type hardware. When open, the accessible exterior doors provide a minimum clear width of 32", which is ample for most types of wheelchairs. All doors have been weatherstripped for thermal protection, with particular attention given to the threshold, or sill, detail in order to ensure that the children using wheelchairs can negotiate the resulting 'bump.' Any bump over 1/2" high was unacceptable, since the children did not have the strength to negotiate this change in level.

The main entrance door and adjacent elevator shaft entry door lead directly into an entrance hall which is large enough to allow for a complete turn in a wheelchair. There is ample clearance at the latch side of both entrance doors to enable a child in a wheelchair to move right up to the side of the door and then open it easily. Without this clearance, the child would simultaneously have to back up and open the door — a difficult task! The floor finish in the entry area is sheet vinyl, giving a wheelable surface which is easy to clean — a must considering the mucky boots and wet wheels often found in the Osborne home.

A storage closet is provided directly off the entrance hall. Sliding doors are used giving access to bi-level coat storage. A lower rack was installed for the smaller children and those using wheelchairs.

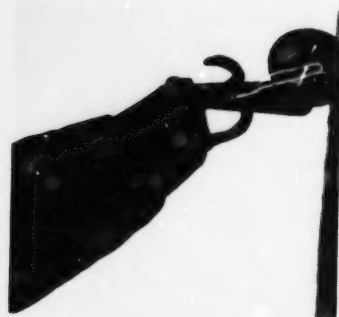


A bi-level storage closet can be used by all children, big and small.

The spacious entrance easily facilitates a complete turn in a wheelchair.



Covered main entrance and
elevator shaft doors.



Lever door hardware is easier to
manipulate than the conventional
knob type.



INTERIOR CIRCULATION

"All the hallways are wider [than standard] and yet it doesn't seem like an institution. I don't think a person walking into the house would recognize anything different."

The design of hallways and connecting spaces within a home is particularly important in terms of wheelchair requirements. For the Osbornes, movement between spaces within the home is achieved by the use of hallways, stairs, elevators and in some cases by circulating through other rooms. All of these building elements have been designed with accessibility requirements in mind. Corridors are typically about 3' wide, but the hallways in the Osborne house are 4' wide to allow ample wheelchair turning space into the doorway of each room. Each of the doors is 36" wide to give adequate clear space when open for a person in a wheelchair to pass. Normally a 32" or 34" door would be sufficient in width. However, Michele Osborne uses a wheelchair with a tray and bliss board attached. This type of equipment increases the critical dimension required to move about and/or turn. As with the exterior doors, lever hardware is used on all interior doors to allow those family members with reduced hand function to operate the doors without having to grip or rotate their wrists.

Most rooms within the house have at least one area that is unobstructed to allow a wheelchair a complete 360° turning radius. This design feature eliminates the need to back out of dead-end spaces, which can be awkward at times. A standard wheelchair requires a 5' diameter turning circle, but this dimension was enlarged in the Osborne home to accommodate Michele's wheelchair.

Two separate stairways (one existing and one new) link the lower levels of the house. In addition, a third existing stair gives access up to the master bedroom area on the second floor. All stairways are equipped with a tubular handrail on one side. The new staircase was designed with steps 6¾" in height (rise), and 11" in length (tread). These dimensions provide a comfortable and safe stair. A securely fitted carpet is used on all stairs which helps to eliminate the protruding and potentially dangerous stair nosings.

A second elevator was installed in the new addition (the original elevator is located within the existing house and remains operable in case of breakdown or maintenance of the new one) for a number of reasons. Current technology had vastly improved the safety features for elevating



The exterior elevator entry is ideally located for easy access.

Elevator cab at first floor level.



A wider hallway allows a wheel-chair user to move freely into the doorway of any room.



Elevator cab at first floor level.



devices, and, more significantly, the model chosen could be used independently by the children. In addition, the Osbornes had discovered that the location of the original elevator was not ideal. This location would have been even worse for access and egress after the extension had been built.

The new elevator has a more ideal location and features: a chain drive mechanism operated by electric current from a standard 15amp house circuit; an oversized lift platform to accommodate Michele's wheelchair with tray and bliss board attachment; a manual override to lower the platform to the bottom level in the event of a power failure; protective walls on two sides of the platform (although it is open to the elevator shaft) and entry doors on the other two sides; a ceiling with lighting incorporated over top of the platform; push button controls to move the elevator between stops; a handrail provided to steady standing passengers; an emergency call button mounted at reachable wheelchair height; and an optical self-levelling feature which automatically stops the elevator at each floor level (without this feature the operator would have to stop the elevator by releasing the push button at exactly the right time in order to line up accurately with each floor). In addition, the elevator entry doors to the shaft feature glass vision panels and an electronic interlock device to prevent them from being opened if the elevator cab is not at that level. Also, an automatic door-opening device has been installed at the exterior shaft door. Once this stop has been selected, the door will automatically open and close when the lift platform reaches that level. Similarly from outside, once the elevator is called the door will open and close automatically as the platform reaches that stop. This feature has been incorporated to assist those in the family who have reduced hand function and have difficulty operating regular door hardware.

LIVING SPACES

"We had to have more room...and we needed solid furniture....a child with crutches may need to hold onto furniture that is stable...a child with poor coordination tends to fall more often....if you buy something where one scratch will upset you and you have a child with a hook [for a hand] it's not going to be very good."

The living room is located on the main floor (upper level) of the new addition. It is adjacent to the kitchen, dining and family room areas of the existing house and is connected by a large opening and pass-through from the kitchen. The focal point of the spacious new room is a large woodburning stove. A high cathedral ceiling, skylights and large south-facing windows allow in plenty of natural light. White walls, exposed woodwork and mirrors give the space a contemporary look, and the warmer elements are effectively provided by the choice of furnishings and floor finishes.

In terms of furniture, the Osbornes closely examined many types before making a final selection. The furniture is comfortable and very sturdy. Large, round seating platforms have been built by Ray Osborne to accommodate a variety of seating requirements for one or more persons. The height of the seating units is convenient for transferring from a wheelchair. They have been designed without arms so as not to impede transferring, and are covered with hypo-allergenic carpeting for a comfortable, hardwearing and easy-to-clean finish. Worktables are also provided in the living room with enough clearance underneath so that they can be used by children in wheelchairs.

The windows in the new addition are all casement types. They have been installed with a low sill height to allow for the lower eye level of the smaller children, and those persons using wheelchairs. The furniture has been placed to afford adequate maneuvering and turning space for the wheelchairs and other mobility aids used in the home. Like any family, the Osbornes have arranged their furnishings to suit their needs, and have created the atmosphere of warmth that characterizes their home. Floor finishes used in the living areas include low pile hypo-allergenic carpeting and sheet vinyl flooring, both of which permit easy wheelchair movement and are easily maintained — a must for a family of 16 enthusiastic children! Other details have been chosen with equal care. Wall switches are mounted 38" and power outlets 18" above the finished floor level. Gina and Ray made a conscious decision not to mount some of the controls such as thermostats at an accessible height. This prevents them from being used, and misused, by all but the oldest children!



The living room with large, round seating platforms.

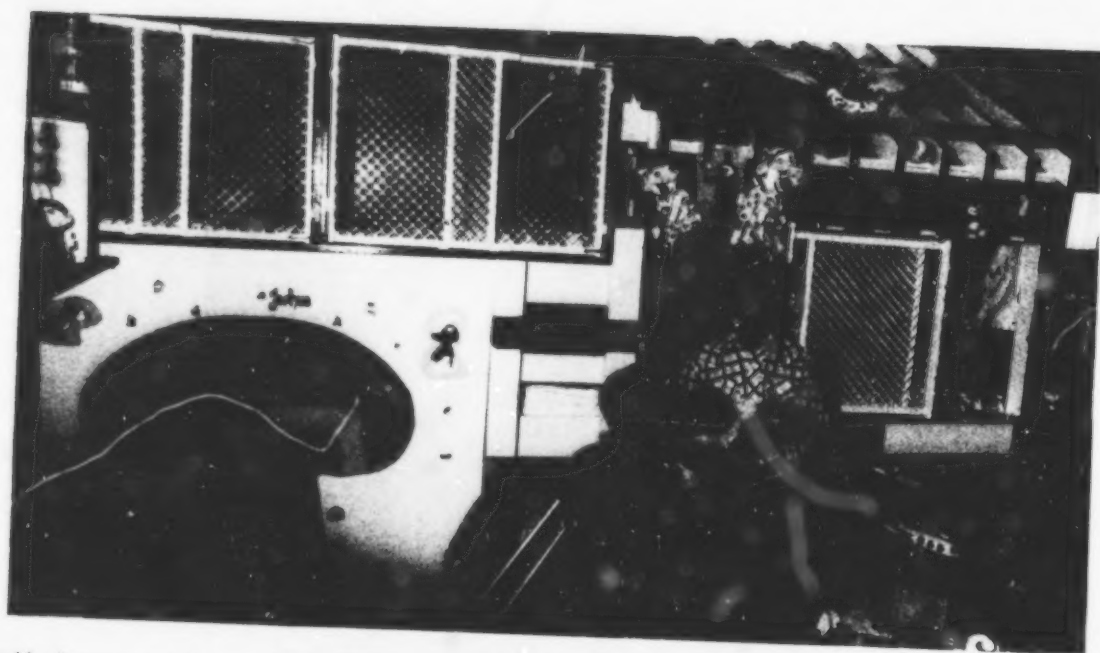
A low window sill height allows all family members to look out.



BEDROOMS

"All the toileting and diapering [devices] are in drawers under the bed....they're accessible, they're there, and they're also out of the way. Nobody sees what's in it when the drawer is closed. Nobody knows that the child is any different than the others. I think it's important to the dignity of the person and it's important for the people looking after them."

The design of all the bedrooms and the selection and arrangement of the bedroom furniture make the rooms fully accessible to the children who use wheelchairs. This ensures that the disabled family members can visit and play with their brothers and sisters and are not confined only to certain areas of the house. All of the bedroom doors are wide enough for wheelchair access and have sufficient space to allow a 360° turn. Where provided, desks and worktables have enough space underneath to facilitate their use by children in wheelchairs. One of the normally simple routines of daily family life, getting in and out of bed, can be a major problem for some of the Osborne children. Because of this, each sleeping area was considered carefully and designed for the requirements of the individual. Talli, who is very short in stature, required a low bed. Michele, who is totally dependent on others to transfer her from the wheelchair to the bed, uses a water bed (for therapeutic reasons) which is located at a height best suited for the helpers who lift her. Many of the beds within the home were custom built by Ray Osborne himself. Window heights, floor finishes, switches and controls within the bedroom areas are located to maximize independence (see Living Spaces). Each bedroom has its own storage closet. The clothes rails and shelves within the closets have been adjusted to suit different reach and height dimensions. The system is also adjustable to accommodate the changing requirements and dimensions of the children as they grow.



Customized bedspaces: note the accessible storage space below one of the beds.



BATHROOMS

"We used grab bars that are coloured instead of chrome, which tends to take away from the idea of institutionalization....the urinal comes in basic white...we had to have it sprayed. It may be an institutional object, but it doesn't have to look like it in there."

Generally the washroom area of any home requires a great deal of planning. For the Osbornes, the problems were augmented because of the family size and the variety of abilities and disabilities. After considerable thought, the Osbornes decided to have 'oversized' communal washroom facilities installed in their new addition. Although somewhat atypical, the new bathrooms contain most of the elements and design features considered essential in any accessible washroom.

Two new washrooms are provided adjacent to the bedrooms on both levels of the house. They are identically equipped with a toilet, two washbasins and a communal shower area. The upper washroom also has a urinal. Access to each washroom is through a 32" clear opening via a sliding pocket door. The washrooms are separated into two basic areas: the toilet and washbasins in one area and the communal shower in the other. Both areas are large enough to allow a 360° turn in either a wheelchair or a shower-commode chair.

The toilet fixture is located in the corner of the room. The walls at the side and rear of the toilet are reinforced and grab bars are provided. The reinforcing is extensive to allow the grab bars to be relocated and adjusted as the children grow and their reaching capabilities change. Maneuvering space is available at the front and side of the toilet to facilitate different transfer techniques. The toilet is a standard-height fixture, not a high wheelchair-type, to allow the use of a commode chair.

Two washbasins are provided in each bathroom, one of which does not have a storage cabinet below, thus creating knee space for wheelchair users. The other basin does have a vanity-storage unit below and also incorporates an electrical outlet on the front face of the vanity. This placement allows it to be reached and used by all family members.

Single-lever-controlled water faucets are installed at each basin which can be easily used by those children with reduced hand function. The faucets are pressure balanced to ensure an even flow of water with a consistent temperature and to prevent scalding or burns. In addition, exposed hot water supply and drain pipes below the accessible washbasins have been insulated to prevent burns.

A urinal is located in the upper bathroom to provide more inde-



Two washbasins and a vanity unit which meet the need for storage and wheelchair accessibility.



Accessible faucet pressure-balanced to avoid sudden changes in water temperature.



pendence to those children who have difficulty balancing at, or transferring onto, a toilet. Unlike most conventional installations, the urinal was recessed flush with the floor to avoid having to step up onto a platform. Unfortunately, the urinal was only available in a white enamel finish and did not match the bone colour of the other fixtures which was carefully chosen by the family to avoid the look of an institutional environment. Consequently, the Osbornes had the fixture finished with a spray-on enamel to match.

The two shower areas were designed to allow wheelchairs and shower-commode chairs to gain access without encountering the usual water stop or curb. Typical shower construction requires this curb to retain excess water within the confines of the shower area. The Osbornes overcame the problem by using a gently sloping floor which falls to a floor drain in each shower area. Walls within the shower areas have a cement board backing instead of drywall, which often breaks down with the effects of constant water spray. The walls and floors have been finished with a waterproofing layer and ceramic tile, and nonslip tiles have been used on the floors. After a few uses of the showers, the Osbornes decided to install shower doors for the purposes of privacy and better containment of the water spray. The doors do not impede access and reduce the openness of the shower areas, making the rooms less institutional. A disabled child in a shower-commode chair and a helper can comfortably use each shower area. The controls are located at different heights to accommodate the varying size and reach dimensions of the family members. One can operate them without having to pinch, grip or twist. A pressure-balanced system has again been used, and two of the shower heads in each room have a hand-held flexible hose assembly. For safety, grab bars are also provided at one shower location in each bathroom.

Bathroom accessories, including mirrors and coat hooks, have been located at a variety of heights for use by all. In addition, an emergency call button has been incorporated into each bathroom, adjacent to the toilet fixture. This feature is important in order to alert others if a fall or accident should occur.

Shower controls with handy grab bars behind.



THE KITCHEN

"As the children got older, and that included the disabled children, they wanted to do more cooking...be more a part of the household. We have always encouraged that. It was necessary to look at how they can best use it [the kitchen]....even the little kids wanted things adapted so they could use it."

The members of the Osborne family are encouraged to participate in all kitchen activities to the extent that their abilities will allow. Most of the facilities have been made accessible to everyone by means of a variety of work heights, storage options and appliance configurations. The kitchen incorporates two U-shaped counter areas, each of which has adequate maneuvering space for wheelchair users. Where maneuvering space is tight, corners of cabinets and walls have been protected against impact damage from wheelchairs by the installation of painted angle-iron bumper guards. A window opening has been incorporated above the sink to maximize the natural light from the entrance hall skylight and to allow supervision of the hall and living room areas. One section of the kitchen has a countertop height of 33" for the convenience of wheelchair users and those family members of short stature. The remaining countertop is located at the standard height of 36".

Storage cupboards, accessible by all family members, are provided below part of the area under the countertop. Upper wall cupboards are also used in some areas. The handles on all cupboards are D-shaped to allow easy use by persons with reduced hand function. The more conventional knob-type handles require fine motor control of the fingers to operate. The Osbornes have also incorporated open storage areas in the pantry and on movable trolleys throughout the kitchen. The open storage and shelving enables family members to review and gain easy access to the stored items. The trolleys also have the advantage of being movable, thereby increasing maneuvering space when required.

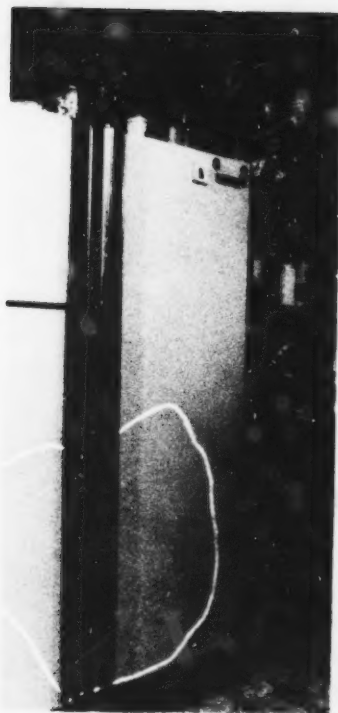
The lower countertop area incorporates a sink with two basins, one of which is shallow. Reaching the bottom of a deep sink can be difficult, if not impossible from a sitting position. The sink faucet is a single-lever type for easy use by persons with reduced hand function and it is pressure balanced to avoid burns. One accessibility aspect not incorporated in the Osborne kitchen is knee space below the sink. The present configuration can only be used when the child positions his or her wheelchair sideways to the sink. Knee space below the sink would allow the user to face forward — perhaps a more practical alternative. With this type of arrangement, however, care must be taken to insulate hot water supply and drain



lines to prevent burns to the legs.

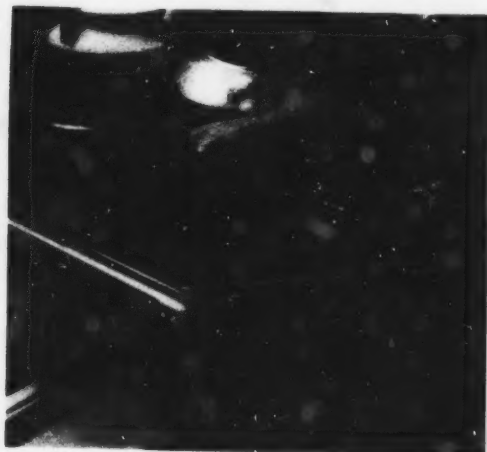
The kitchen appliances have been chosen for easy use by all family members. A side-by-side fridge/freezer is used so that at least some of the fridge and freezer shelves can be reached by all the children. A second fridge with the freezer compartment on top is also used, but by design is inaccessible to many.

Three stovetops have been incorporated into the kitchen design and located at two different work heights. They are mounted on or built into the countertop, and have front-mounted controls which eliminate the need to stretch over hot elements to control the stove. Ideally, the stove elements should be staggered — again to prevent burns. A conventional oven is used, located above one of the stovetops, at a convenient eye level for Gina and Ray. Accessible oven facilities are provided by two microwave ovens located below the countertops at heights suitable for use by even the smallest family members. One of the microwave ovens is built into a movable trolley to facilitate easy access. Two dishwashers and a garbage compactor are also provided in the kitchen area.



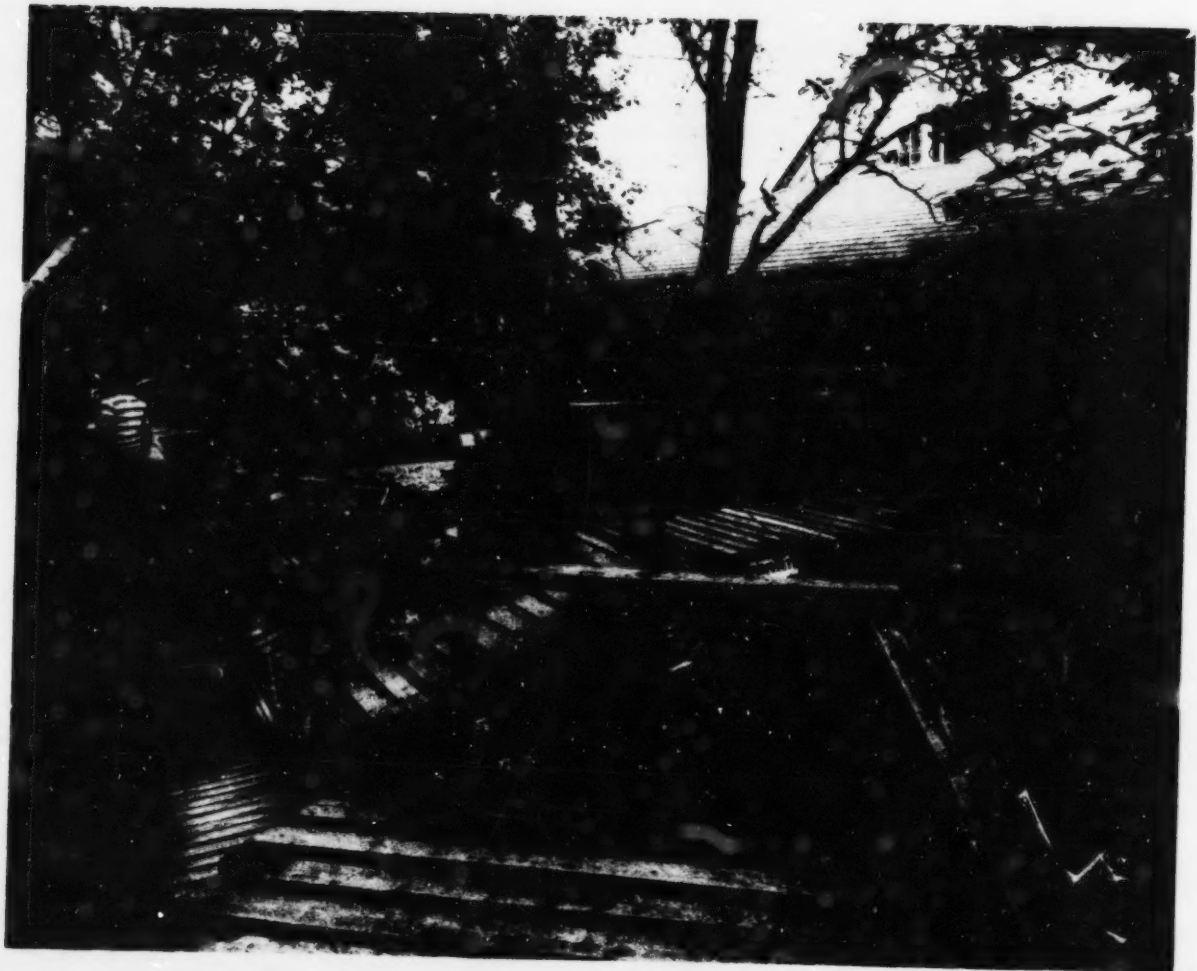
Side-by-side fridge/freezer and open storage.

Stovetop with easy-to-use front-mounted controls.



OTHER SPACES

A new laundry room with two washers, two dryers and a large storage and ironing area was incorporated into the addition. Since all of the Osborne children are encouraged to participate in laundry activities, to the extent that their abilities permit, the room was designed to be accessible to all. On the lower level, a whirlpool bath area is included as a therapy facility, especially for Michele Osborne. A sauna is also planned in this area for the enjoyment of all family members.



PLAY SPACES

"We had to have wheelchair access to the yard for recreation. We had to have access to the pool area. The [disabled] child should have the same option to be outdoors as the others, but be well supervised."

Play and recreation is an important part of family life. Knowing this, the Osbornes did not forget to upgrade and add additional play spaces when planning their renovation. The interior of the addition does not have any play spaces specifically defined as such, but there are many areas intended to be suitable for play. Essentially, the whole house can be, and is, used as a play space. Bright rooms, soft floor surfaces, sturdy furniture and accessible storage facilities are all features that invite and encourage the children to play and socialize.

Outside of the house, a number of new play facilities have been provided. The paved driveway and other level landscaped surfaces are excellent play areas for all of the children.

Some of the soft-surfaced landscaped areas are also accessible to wheelchair users. The porte-cochère allows for outside play in most weather conditions by providing a large area sheltered from sun, rain or snow.

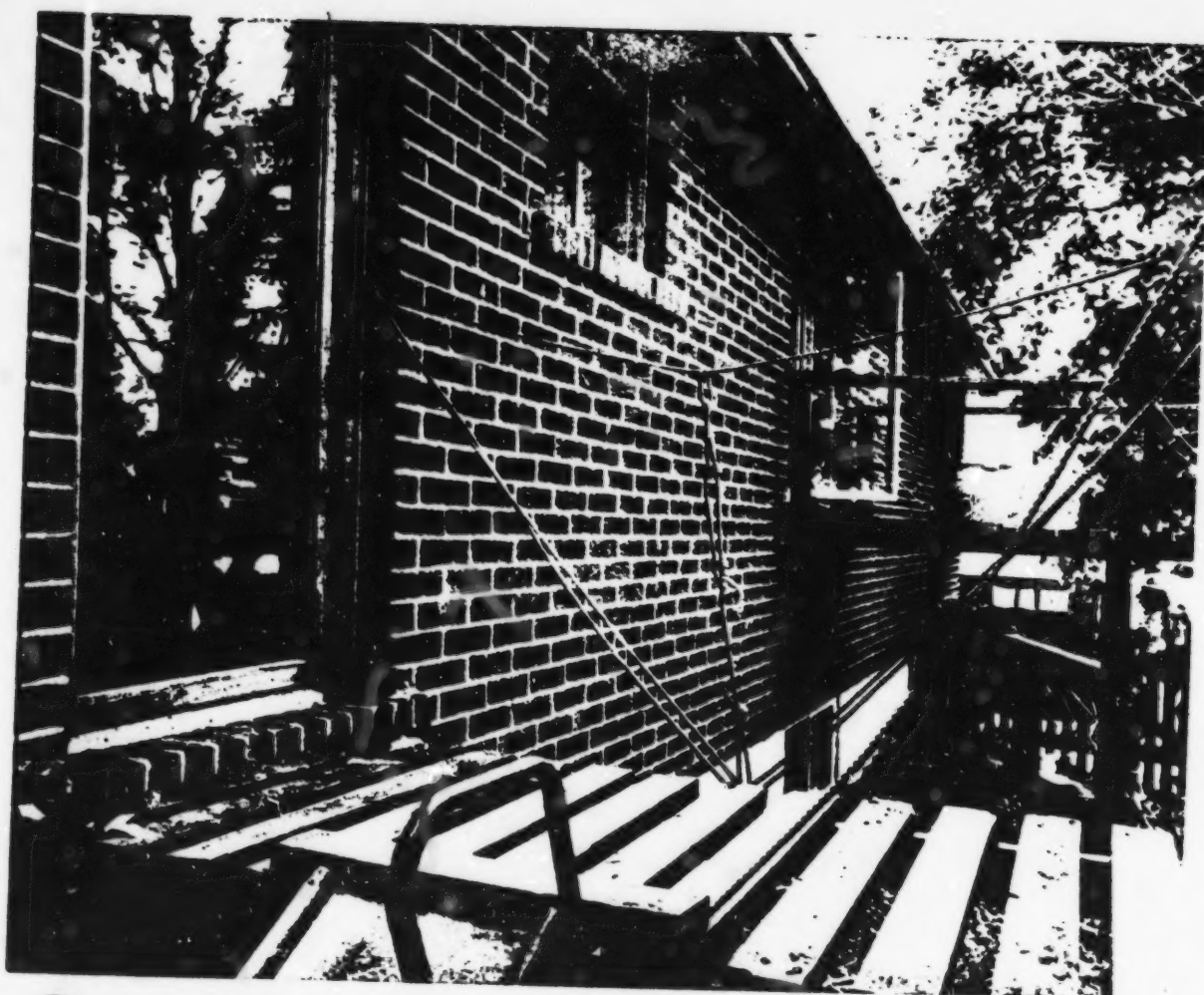
The new deck structure provides another accessible play area, incorporating a ramp from the upper level of the house to the pool area. The enclosed and roofed gazebo is also used for play and recreation, offering protection from the weather and from insect bites.

A secure enclosed play area is also provided at the front of the new addition which can be viewed from the kitchen and living areas of the home. Patrick Osborne, who is developmentally disabled and unaware of the dangers of roads and traffic, frequently plays in this area. The space is secure and the access gate has an alarm to warn of any departure from the area.

Another play area, which was built earlier by Ray, is located to the west of the house. It incorporates climbing equipment, bridges and tree houses, all of which are accessible to most of the family. A bark-chip ground surface provides relatively easy wheelchair access and a soft landing to the falls that are inevitable.

All of the members of the family are encouraged by their parents and by the environmental provisions to participate in leisure activities.

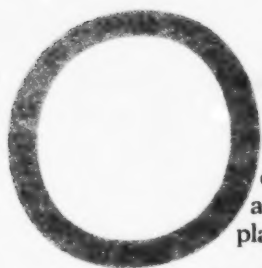
Play area to the west of the house.



CHAPTER 4

Fire and life safety

"The children can run into problems so we have put panic buttons in the bathrooms and the elevator. If it happens to be that Mom and Dad aren't around, there will be some way of getting help if something did happen. We also implemented a fire alarm system which is tied into a monitoring agency. That again, we feel, is a necessity. Also, we don't want for one minute that one of our children be hampered by another's disability. We tried to teach each how to get away [in an emergency]....they must go outside no matter how, if they crawl, if they roll, or whatever....They're not going to wait for the sibling who is supposedly going to take them out, because that sibling might be overcome by smoke."



One of the basic design criteria for the Osbornes was the upgrading of existing fire and life safety systems within their home. Fire and accident prevention measures, along with evacuation and emergency planning, were considered during the planning of the new addition.

The layout of the addition includes four new entrances/exits from the house. These, along with two exits in the existing part of the house, ensure that there are always two routes of escape, in different directions, from most areas of the home. An escape window can be used as an alternative exit from two of the bedrooms in the existing part of the house, giving access to a climbing play structure to get to ground level. Family members who use wheelchairs or other mobility aids have bedrooms closest to the exit doors to facilitate a quick escape. For safety reasons, elevators are not to be used in an emergency, but a ramp incorporated into the new deck structure provides access to grade.

The Osbornes have developed a family fire safety plan to be used in an emergency. Each person within the house is familiar with all the exit routes and is assigned a specific routine to follow should a fire or other life-threatening situation occur. A "buddy system" is used whereby older and nondisabled family members are responsible for assisting a particular brother or sister to exit the house. If a child's "buddy" does not arrive within a reasonable amount of time, each child has also been taught to crawl, roll or use whatever means they can to get to the nearest exit. The fire safety routine is practised regularly, but unannounced and at varied intervals.

All areas of the house (new and existing) are serviced by an electronic smoke detection system which emits a loud shrill sound throughout the house if smoke is detected. The system operates using the house electricity system but also has a back-up battery system in case of power failure. The system is linked directly, through existing telephone lines, to a monitoring agency which automatically notifies the fire department if any of the smoke detectors are activated.

The Osbornes stringently apply commonsense fire prevention techniques, particularly concerning flammable materials, clothing and storage. Great care is taken with heat-generating fixtures and appliances, including

their woodburning stoves, space heaters, electric baseboard heaters and kitchen appliances. Fire extinguishers are also located throughout the house. The local fire prevention officer was asked to inspect the home but had little to add. He did request and was given a drawing locating the bedrooms and a schematic layout of the house, for the use of the fire department in an emergency.

Other systems and features in the home consider safety risks other than fire safety. An intercom system has been installed in the new and existing areas of the house to enable the Osbornes to communicate with their children regardless of location. Gina and Ray feel that this is particularly important at night, because their bedroom is located on the second floor, away from the children. A panic alarm system has also been installed in a number of areas where a child might find himself alone and in difficulty, unable to call for help. The system is especially important, for example, in the bedrooms and bathrooms, since these are areas where children transfer into and out of their wheelchairs and therefore where the possibility of a fall is greatest. A panic button is also provided in the elevator cab in the event of the elevator breaking down between floors. The panic alarm system is again monitored by an outside agency which automatically informs the police if the system is activated.

Another safety system used by the Osbornes is a series of chain locks with alarms on all of the exterior doors. This acts as a burglar alarm system. If a door should be opened with the chain not in the locked position, an alarm is sounded (a key deactivates the system). This is also a safety device to protect Patrick, who is developmentally handicapped and has a constant desire to explore the roads and gardens outside of the Osbornes' property.

Some of the less obvious features which nevertheless contribute to safety in the house include: pressure-balanced faucets and controls on all basins and showers to prevent scalding; grab bars and secure gripping surfaces in all areas where transfers to and from a wheelchair are likely; soft floor surfaces; ground fault interrupted electrical circuits in potentially dangerous areas such as bathrooms; and electric interlocking devices on elevator doors to ensure that the doors will not open unless the cab is at that level.

The layout of the space itself is also conducive to safety through supervision. The kitchen, for example, overlooks many areas including the garden, the entrance hall, the living room and the dining room. This permits Gina and Ray to supervise these areas, even during meal preparation. Many of the other living spaces interconnect to facilitate supervision, while not detracting from the children's privacy or independence. Other detail design features contribute to a safer environment. All essential switches and controls, for example, are within easy reach of all members of the family. This eliminates excessive stretching or over-extending by the children, thus reducing the chances of an accident or a fall.

CHAPTER 5

Approximate costs and funding sources

"I think the [final] cost was double the initial cost....you have the basics included in your total, but then the builder says, well, the power to it is extra...the panic alarm to it is extra, the finishing inside is extra....there is this constant [reality] that things will cost more. You have a lot of guilt because you think that if I don't do it better this time, I'm going to be trapped ...and so you spend more money."

APPROXIMATE COSTS

Base house contract price	\$72,160
Options Not Included in Contract Price	
Porte-cochère	7,200
Remodelling of exterior stair	1,455
Elevator	16,700
Extra skylight	950
Deck structure	6,800
Extra sliding door	500
Custom closet work	2,400
Cement wall board in shower areas	350
Upgraded tiling in bathrooms	120
Upgraded faucets and shower controls (pressure-balanced type)	2,000
Electrical fixtures	3,000
Carpeting	4,800
Whirlpool bath	3,900
Extra aluminum siding	600
Unforeseen Extras	
Miscellaneous rough carpentry work	1,500
Miscellaneous plumbing work	680
Upgraded Services Not Included in Contract Price	
400 amp electrical panel and wiring	8,400
Water supply system (connected to main from well)	3,700
Septic system	31,200
Sump pump	350
Finish Work Undertaken by Osbornes (material cost only)	
Painting	1,200
Fencing	1,500
Landscaping	800
Consultant Costs	
Feasibility study and initial schematic design	1,500
Preparation of drawings and specifications for tendering	—
Preparation of drawings for permit and construction	400
Permit Costs	
Building permit examination fee	150
Building permit fee	760
Plumbing permit fee	150
Miscellaneous Costs	
Lawyers fees (for new mortgage and removal of liens)	—

FUNDING SOURCES

Order in Council from Government of Ontario Residential Rehabilitation Assistance Program (RRAP) loan from the Canada Mortgage and Housing Corporation (CMHC)	\$52,000
Donation from Kiwanis Service Club	10,000
Donation by Ontario Easter Seal Society through Rotary Club	10,000
Donation by the Canadian Mortgage and Housing Corporation (CMHC) through the Canadian Housing Design Council (for the family's participation in the project to produce this book)	14,000
New mortgage	3,000
Personal loan from a relative	40,000
Osborne family savings	10,000
	36,000

CHAPTER 6

The project team and product inventory

"When you go to a consultant agency, don't be intimidated because they're the consultant and you're paying them, or even if it is gratis. Don't assume that because they're doing this for you you should follow their advice. Always hold on to the belief that you know what you want and be assertive enough to say that. You don't want to end up with a home that doesn't meet your needs."

PROJECT TEAM

Architects

Cluff and Cluff Architects
and Planners
191 Eglinton Avenue East
Toronto, Ontario
M4P 1K1

Neil J. McDonald Architect
308 Winston Road
Oakville, Ontario
L6L 4W5

Consulting Organizations

The Barrier Free Design Centre
Muscular Dystrophy Association
of Canada
357 Bay Street, 10th Floor
Toronto, Ontario
M5H 2T7

Peel Non-Profit Housing
Corporation
c/o Department of Social Housing
10 Centre Drive
Brampton, Ontario
L6T 4B9

Building Contractor

Cantin Special Additions
1075 Meyerside Drive, Unit 7
Mississauga, Ontario
L5T 1M3

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L5T 1M3

PARTIAL PRODUCT INVENTORY

Aluminum Siding	• Alcan Products Canada Ltd. 120 McLevin Avenue Scarborough, Ontario M1V 3E9
Automatic Door-Opening Device	• Stanley Canada Inc. 42 Queen Elizabeth Boulevard Toronto, Ontario M8Z 1M1
Bathroom Fixtures	• American Standard 500 Sheppard Avenue East Suite 204 Willowdale, Ontario M2N 6H7
Brick	• Brampton Brick Ltd. 514 Main Street North Brampton, Ontario L6V 1P9
Closet Doors and Fixtures	• Spectrum Industries 7419 Bren Road Mississauga, Ontario L4T 3V4
Door Hardware	• Schlage Canada 1083 Rangeview Road Mississauga, Ontario L5E 1M2 • Amerlock Corporation Box 100 Meaford, Ontario N0H 1Y0
Door Alarm System (Chain Burglar Alarm)	• Made in Hong Kong and supplied by: Pascal Hardware 1571 Sandhurst Circle Agincourt, Ontario M1V 1V2
Elevator	• Robertson Custom Aids Ltd. 777 Warden Avenue, Unit 12 Scarborough, Ontario M1L 4C3
Faucets and Shower Controls	• American Standard 500 Sheppard Avenue East Suite 204 Willowdale, Ontario M2N 6H7
Grab Bars (Towel rails were used)	• IKEA Limited 1224 Dundas Street East Mississauga, Ontario L4Y 2C1
Intercom System	• Mirtone Intercom-Systems 425 Alness Street Downsview, Ontario M3J 2H4
Paint	• C-I-L Paints (Bapco) 8200 Keele Street Concord, Ontario L4K 2A5

Panic Alarm System	• Romex Security Systems Inc. 1898 Wilson Avenue Weston, Ontario M9M 1A8
Pressure-treated Lumber	• Timber Specialties Limited 6521 Mississauga Road Mississauga, Ontario L5N 1A6
Roof Shingles	• IKO Industries Limited 71 Orenda Road Brampton, Ontario L6W 1V8
Sauna Heater	• Jacuzzi Canada Limited 330 Humberline Drive Rexdale, Ontario M9W 1R5
Skylights	• Velux-Canada Inc. 151 Carlingview Drive, Unit 5 Rexdale, Ontario M9W 5S4
Sliding Doors	• Allied Plastics Limited 707 Arrow Road Weston, Ontario M9M 2L4
Smoke Alarm System	• Robert Hunt Corporation 250 Bowes Road Concord, Ontario L4K 1J9
Storage Units	• Romex Security Systems Inc. 1898 Wilson Avenue Weston, Ontario M9M 1A8
Vinyl Flooring	• Sears (Simpsons-Sears Ltd.) 222 Jarvis Street Toronto, Ontario M5B 2B8
Whirlpool Bath	• Armstrong Flooring 2233 Argentia Road Suite 201 Mississauga, Ontario L5N 2X7
Windows	• Jacuzzi Canada Ltd. 330 Humberline Drive Rexdale, Ontario M9W 1R5
Woodstove	• Robert Hunt Corporation 250 Bowes Road Concord, Ontario L4K 1J9
	• Elmira Stove Works 22 Church Street Elmira, Ontario M3B 1M3

CHAPTER 7

Resources and contacts

"You make 21 out of 22 phone calls.... someone refers you to some place else and then you finally hit the right person the last contact sometimes should have been the first contact given."

his chapter provides a listing of resources and contacts which are likely to be of use to you. The lists are not definitive, but in many instances individual items will lead you to other sources. When searching for information, one word of advice: don't be restricted to medical or social service texts alone. Some of the best ideas can be found in weekend magazines and design books; all that is required is simple adaptation and a willingness to imagine.

RESOURCES

ACCENT on Living Magazine. Published quarterly by ACCENT Special Publications, Bloomington, Ill.

Canada Mortgage and Housing Corporation. *Accessible Residential Communities: Issues and Solutions*. Ottawa, 1982.

—— • *Housing Disabled Persons*. Ottawa, 1982.

—— • *Housing Needs and Problems of Disabled Persons*. Ottawa, 1982.

—— • *Two Studies for People with Disabilities*. Ottawa, 1982.

—— • *Cost and Design of Housing for Disabled Persons: Case Studies*. Ottawa, 1983.

Cary, Jane R. *How to Create Interiors for the Disabled: A Guidebook for Family and Friends*. New York: Pantheon Books, 1978.

Casto, M.D., and Day, S.S. *Adaptive Housing for the Physically Handicapped*. Monticello, Ill.: Council of Planning Libraries, 1975.

Davis, Wendy M. *Aids to Make You Able: Self-help Devices and Ideas for the Disabled*. Don Mills, Ont.: General Publishing Co., 1981.

Eastern Paralyzed Veterans Association. *Wheelchair House Designs*. New York, n.d.

Goldsmith, Selwyn. *Designing for the Disabled*. New York: McGraw-Hill, 1981.

Harkness, S.P., and Groom, J.N. Jr. *Building Without Barriers for the Disabled*. New York: Whitney Library of Design, 1976.

- Harpin, Phillipa. *With a Little Help: A Guide to Aids and Adaptations for People with Muscular Dystrophy and Allied Neuromuscular Disorders*. London: Rank Xerox (Copy Bureaux) Ltd. (Volume titles include: Introduction and Adaptations, Bedroom and Clothing, Bathroom, Household and Seating, Communication, Mobility, Leisure, Index.)
- Kushner, Carol; Falta, Patricia Ladia; and Aitkens, Andrew. *Making Your Home Accessible: A Disabled Consumer's Guide*. Ottawa: Canadian Housing Design Council and Consumer and Corporate Affairs Canada, 1983.
- Lifchez, Raymond, and Barbara Winslow. *Design for Independent Living*. New York: Whitney Library of Design, Watson-Guption Publications, 1979.
- Mace, R.I. *Accessibility Modifications*. Raleigh, N.C.: Barrier Free Environments Inc., 1976.
- • *Accessible Housing*. Raleigh, N.C.: North Carolina Department of Insurance, 1980.
- Minnesota Housing Finance Agency. *Home Accessibility Information Series*. Titles include: Introduction, Movement, Ramps, Steps, Lifts, Bathrooms, Kitchens, Grab Bars, Controls.
- Muscular Dystrophy Association. *TIPS: Special Issue on Interiors*. New York, 1979.
- • *TIPS: Special Issue on Housing*. New York, 1982.
- National Centre for a Barrier Free Environment. *Access Information Bulletin*. Washington, D.C. (Titles include: Adaptable Housing; Choosing an Accessibility Consultant; Doors and Entrances; Elevators and Lifts; Environments for All Children; Fire Safety; Interior Furnishings and Space Planning; Kitchens; Multi Family Housing; Ramps, Stairs and Floor Treatments; Recreation; Restrooms; Single Family Housing Retrofit.)
- • *A Collection of Single Family House Plans*. Washington, D.C., n.d.
- National Handicap Housing Institute Inc. *Survey of Handicapped Individuals' Housing Preferences*. Minneapolis, n.d.
- Ostroff, Elaine. *Humanizing Environments*. Cambridge, Mass.: the World Guild, 1978.
- Paralyzed Veterans of America. *Home in a Wheelchair*. Washington, D.C., n.d.
- • *The Wheelchair in the Kitchen*. Washington, D.C., n.d.
- • *Wheelchair Bathrooms*. Washington, D.C., n.d.

Raschko, Bettyann Boetticher. *Housing Interiors for the Disabled and Elderly*. New York: Van Nostrand Reinhold, 1982.

Snell, Heather. *The Accessible Home: Renovating for Your Disabled Child*. Toronto: Is Five Press, 1983.

"The Accessible Home." *Better Homes and Gardens Remodeling Ideas*, Fall 1981, pp. 65-79 and 115-16.

The Source Book for the Disabled. New York: Bantam Books, 1981.

Thompson, M.M. *Housing and Handicapped People*. Washington, D.C.: the President's Committee on Employment of the Handicapped, 1976.

U.S. Department of Housing and Urban Development. *Adaptable Dwellings*. Washington, D.C., 1979.

———. *The Built Environment for the Elderly and the Handicapped: A Selective Bibliography*. Washington, D.C., 1979.

Veterans Administration. *Handbook for Design: Specially Adapted Houses*. Washington, D.C., 1978.

CONTACTS

American National Standards
Institute
1430 Broadway
New York, New York 10018
U.S.A.

The Arthritis Society
Suite 420
920 Yonge Street
Toronto, Ontario
M4W 3J7

The Barrier Free Design Centre
357 Bay Street
10th Floor
Toronto, Ontario
M5H 2T7

Blissymbolics Communication
Institute
c/o Hugh MacMillan Medical
Centre
350 Rumsey Road
Toronto, Ontario
M4G 1R8

Canadian Association for Health,
Physical Education and
Recreation
333 River Road
Vanier, Ontario
K1L 8B9

The Canadian Cerebral Palsy
Association
55 Bloor Street East
Toronto, Ontario
M4W 1A9

Canadian Co-ordinating Council
on Deafness
Suite 201
294 Albert Street
Ottawa, Ontario
K1P 6E6

The Canadian Council of the Blind
96 Ridout Street Station
London, Ontario
N6C 3X4

Canadian Federation of Sport for
the Disabled
333 River Road
Vanier, Ontario
K1L 8B9

Canadian Housing Design Council
M-2 L'Esplanade Laurier
171 Bank Street
Ottawa, Ontario
K2P 1W5

Canada Mortgage and Housing
Corporation
National Office
682 Montreal Road
Ottawa, Ontario
K1A 0P7

The Canadian National Institute
for the Blind
1929 Bayview Avenue
Toronto, Ontario
M4G 3E8

Canadian Paraplegic Association
520 Sutherland Drive
Toronto, Ontario
M4G 3V9

Canadian Parks/Recreation
Association
333 River Road
Tower B
Vanier, Ontario
K1L 8B9

Canadian Rehabilitation
Council for the Disabled
One Yonge Street, Suite 2110
Toronto, Ontario
M5E 1E6

Canadian Standards Association
178 Rexdale Boulevard
Rexdale, Ontario
M9W 1R3

The Centre of Environment for the
Handicapped
120-126 Albert Street
Camden
London, England

Children's Environment Advisory
Services
Canada Mortgage and Housing
Corporation
682 Montreal Road
Ottawa, Ontario
K1A 0P7

Coalition of Provincial
Organizations of the Handicapped
926-294 Portage Avenue
Winnipeg, Manitoba
R3C 0B9

Health and Welfare Canada
Social Services Division
Room 928
Brooke Claxton Building
de la Colombine Boulevard
Tunney's Pasture
Ottawa, Ontario
K1A 0K9

Multiple Sclerosis Society of Canada
130 Bloor Street West
Suite 700
Toronto, Ontario
M5S 1N5

The Muscular Dystrophy
Association of Canada
357 Bay Street
Toronto, Ontario
M5H 2T7

National Research Council
Building M-50
Montreal Road
Ottawa, Ontario
K1A 0R6

Paralyzed Veterans of America
801-18th Street N.W.
Washington, D.C. 20006
U.S.A.

Royal Architectural Institute of
Canada
328 Somerset Street West
Ottawa, Ontario
K2P 0J8

Spina Bifida and Hydrocephalus
Association of Ontario
10 Trinity Square
Toronto, Ontario
M5G 1B1

Technical Aids Service
2075 Bayview Avenue
Toronto, Ontario
M4N 3M5